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Citizenship: United States of America

My background is quite varied ranging from microfluidics, biomedical and biochemical science to instrumentation and spaceflight, with settings (both in the laboratory and in the field) in private industry, university and government in several countries. At JPL, I am involved in the scientific exploration of space, in particular, the research, planning, testing and/or operations of *in situ* instrumentation. I have over twenty years of experience in biochemical research. I was the Cognizant Engineer for the *ISS*-residing Vehicle Cabin Atmosphere Monitor (VCAM) pre-concentrator/gas chromatograph. I have been on two field trips to Antarctica (2001 and 2005) including one trip to test instrumentation in extreme environments (the McMurdo Dry Valleys). I am also the Discipline Program Manager at JPL for three NASA research programs (EXO, LARS, HW) as well as the SBIR/STTR subtopic manager for two *in situ* instrumentation topics. Additionally, I am involved in a number of educational and outreach activities including mentoring high school, undergraduate and graduate students.

Education

Ph.D., Molecular and Cell Biology, The Pennsylvania State University (1996)
B.S., Genetics, University of California at Davis (1987)

Professional Experience

Jet Propulsion Laboratory:

Discipline Program Manager, Science Research and Analysis Program Office (01/12 – present).

- DPM for Astrobiology: Exobiology and Evolutionary Biology (EXO) program.
- DPM for Laboratory Analysis of Returned Samples (LARS) program.
- DPM for Habitable Worlds (HW) program.
- Coordinate the process for the submittal of JPL proposals to NASA in response to the ROSES NRA.
- Oversee funds received from NASA for both ongoing and new science investigations and monitor investigator spending.

Research Scientist, Planetary Chemistry and Astrobiology Group (10/08 – present).

- PI, An Integrated Microfluidics-HPLC/Miniature Mass Spectrometer Spectrometer Detection System.
- PI, Advanced Concepts in Miniature and MEMS-Based Gas Chromatography.
- Proposal Manger, MARINE concept to the Europa mission AO.
- GC Lead, LAVA/RESOLVE In Situ Resource Utilization (ISRU) KSC/JPL Collaboration.
- SBIR (S1.06) and STTR (T8.01) Lead Subtopic Manager.

Cognizant Engineer, Vehicle Cabin Atmosphere Monitor (VCAM) PCGC (1/07 – 4/10).

- In charge of designing, building and testing of two engineering and two flight gas chromatographs/pre-concentrators (PCGCs) for VCAM, launched to the *International Space Station*, April 2010.
- Prepared critical design reviews, assembly and inspection data sheets, reports and requirements.
- Validation testing of VCAM and final preparation/testing of the six orbital replacement units (ORUs).

Scientist, Astrobiology Research Group (4/04 – 10/08).

- Testing and analysis of a microfluidics size-exclusion chromatograph chip and a thermophoresis chip.
- Lead scientist for a portable gas chromatograph/surface acoustic wave detector system. Conducted field trials in remote locations including Antarctica's McMurdo Dry Valleys.
- Custodian for a Bruker 4-circle diffractometer/multi-wire detector on a sealed-tube X-ray generator.

Senior Scientist, Target Discovery, *Inpharmatica Ltd.*, United Kingdom (8/02 – 4/04).

- Joint Honorary Research Fellow, Biochemistry Dept., University College London, United Kingdom (2002 – 2004). Internal structural biology consultant.

- Spearheaded curation and improvements of a chemico-bibliographic database.
 - Analyzed predicted protein targets for secondary structural assignments. This included analyzing predicted gene products with Inpharmatica's Biopendium™ software on the company's 2500 processor compute farm.
 - Molecular and homology modeling studies of targets of interest. Clients included Chiron, OSI and Serono.
- Senior Research Officer**, Institute for Molecular Bioscience, *University of Queensland*, Australia (10/01 – 8/02).
- Established a high-throughput crystallization and NMR service. This included the sourcing and purchase of robotic equipment, a dynamic light scattering device, and the development of high-throughput protein crystallization techniques/technology.
 - Crystallization and initial X-ray diffraction analysis of protein crystals.
 - Established an accounting system for the crystallographic/NMR service.
- Research Fellow**, School of Biological Sciences, *The University of Auckland*, New Zealand (1/98 – 10/01).
- Crystallization of the azido-met form of embryonic (Portland) hemoglobin. Data collected at the Stanford Synchrotron Radiation Laboratory.
 - Crystallization and structure determination of hemoglobin Bart's, a marker for α -thalassaemia.
 - Subcloning of the C-lobe of saxiphilin into a yeast expression system for eventual crystallization (in collaboration with Dr. Edward Moczydlowski of Yale University).
 - Molecular modeling and docking studies of the binding and electron transfer properties between hemoglobin and cytochrome b₅.
 - Structure determination of a human:mouse chimeric hemoglobin and human apo-lactoferrin.
 - In charge of the Rigaku rotating anode X-ray generator, MarResearch image-plate detectors, Linux-based computers and cryogenic support equipment.
- Postdoctoral Scholar**, Department of Veterinary Science, *The Pennsylvania State University* (8/96 – 12/97).
- Crystallization and X-ray diffraction of potato 5-lipoxygenase (in collaboration with Dr. Gregory Farber, my Ph.D. advisor).
 - Primer synthesis, plasmid preparation, subcloning, over-expression and crystallization of the LOX-1 isozyme from *Solanum tuberosum*.
 - Protein engineering of two distinct domains of 5-lipoxygenase for kinetic and structural studies.

Space Missions

- Vehicle Cabin Atmosphere Monitor (2007 – 2013) launched via *Discovery* (STS-131) to the *International Space Station*, April 2010.
- United States Microgravity Laboratory (USML-2) in Spacelab on STS-73 (*Columbia*) (1995).
- International Microgravity Laboratory (IML-2) in Spacelab on STS-65 (*Columbia*) (1994).
- Crystal growth on *Mir*. Launched via *Progress*, Landing via *Soyuz*. Managed by Payload Systems, Inc. (1993).
- Crystal growth on *Mir*. Launched via *Progress*, Landing via *Soyuz*. Managed by Payload Systems, Inc. (1992).

Review Panels

- Reviewer for JPL Director's Research and Development Fund (DRDF) Program (2007 – present).
- Chair and reviewer for JPL Research and Technology Development (R&TD) Topic Program (2006 – present).
- JPL reviewer for NASA Planetary Instrument and Development (PIDD) Program (2005 – 2007).
- Reviewer for NASA Small Business Innovation Research (SBIR) Programs (2005 – present).
- Reviewer for *Acta Crystallographica Section D: Biological Crystallography* (2004 – 2007).

Recent Proposals Awarded

- NASA ASTID Program – Integrated Microfluidics-HPLC / Miniature Mass Spectrometer Macromolecular Detection System (as PI). 3 years. Awarded FY2012
- JPL R&TD Spontaneous Concept Program – Rapid, Low Cost Risk Reduction of MEMS-Based Gas Chromatography (as PI). 4 Months. Awarded FY2012.
- JPL R&TD Topic Program – Development of a Lab-on-a-Chip Geochemical Ion Chromatograph (LOGIC) for *in situ* Aqueous Analyses (as Co-I). 2 years. Awarded FY2011.
- NASA PIDDP Program – A MEMS-GC and Miniature MS for Planetary Investigations (as Co-I). 3 years. Awarded FY2011.

- JPL R&TD Spontaneous Concept Program – Miniature GC/microDMS System for Mars Mid-Range Rover-Class(s) of Missions (as PI). 4 Months. Awarded FY2010.
- NASA PIDDP Program – An Integrated Microfluidics-HPLC/Differential Mobility Spectrometer Macromolecular Detection System (as PI). 3 years. Awarded FY2008
- JPL R&TD Spontaneous Concept Program – MEMS-Based Gas Chromatography for Planetary Exploration (as PI). 4 Months. Awarded FY2008.
- JPL DRDF Program – Validation of Microfluidic Techniques for Carboxylic Acid Biomarker Analysis in Geologic Samples (as Co-I). 12 Months. Awarded FY2007.
- JPL R&TD Spontaneous Concept Program – Thermophoretic Concentration of Organic Molecules in Simulated Hydrothermal Vent Geometries (as Co-I). 3 Months. Awarded FY2006.
- NASA ASTID Program – Nanofluidic Size Exclusion Chromatograph for *in situ* Macromolecular Analysis (as Co-I). 2 years. Awarded FY2005.
- JPL R&TD Strategic Initiative Program – An Interdisciplinary Study of Titan’s Coupled Atmosphere, Surface and Astrobiological Processes (as Co-I). 3 years. Awarded FY2005.
- JPL R&TD Strategic Initiative Program – Origins of Planetary Systems and the Development of Pre-Biotic Conditions (as Co-I). 3 years. Awarded FY2005.

Countries

- *Countries Employed/Resided:* United States (CA and PA), New Zealand, Australia, United Kingdom.
- *Continents Visited:* North America, Europe, Asia, Australia, Antarctica (two research trips).
- *Countries Visited:* Mexico, Canada, New Zealand, Cook Islands, Australia (5 states/territories), Singapore, Japan, United Kingdom (England, Wales, Scotland), Ireland, France, Belgium, Netherlands, Denmark, Sweden, Germany, Switzerland, Italy, Austria, Czech Republic, Hungary, (and 33 states in the USA).

Selected Honors

- UC Davis College of Biological Sciences Distinguished Alumnus (2014).
- Certificate of Appreciation, SHERLOC Proposal Manager Team, JPL Team Bonus Award (2014).
- Certificate of Appreciation, VCAM, JPL Team Bonus Award (2013).
- Certificate of Appreciation, SBIR/STTR Technical Monitor Team, JPL Team Bonus Award (2013).
- Certificate of Appreciation, SBIR Subtopic Manager Team, JPL Team Bonus Award (2012).
- NASA Group Achievement Award, Habitat Demonstration Unit (2011).
- NASA Group Achievement Award, VCAM (2011).
- Outstanding Accomplishment, VCAM, JPL Mariner Bonus Award (2008).
- Outstanding Accomplishment, VCAM, JPL Mariner Bonus Award (2007).
- Chosen to design the cover of the September 2001 issue of *Protein Science*.
- Accepted into the NSF “Integrative Biology and Adaptation of Antarctic Marine Organisms” course, held at McMurdo Station, Ross Island, Antarctica (2001).
- Awarded a grant-in-aid for travel from the School of Biological Sciences (2001), the Auckland Medical Research Foundation (1999), the Maurice and Phyllis Paykel Trust (1999), the R. Adams Dutcher Fund (1995), the Bristol-Myers Squibb Travel Award (1995).
- Elected to Full Life Membership in Sigma Xi, The Scientific Research Society (1997).
- Second Place Poster Session Winner at the Bristol-Myers Squibb/Center for Biomolecular Structure and Function Joint Symposium, The Pennsylvania State University (1996).
- Dept. of Biochemistry & Molecular Biology Nominee for the Pennsylvania State University Graduate Assistant Award for Outstanding Teaching (1994).
- Recipient of a Life Sciences NASA Space Grant College Fellowship Award, Penn State University (1993).
- Dean’s Honor List, The University of California at Davis (1984).
- Recipient of a UC Davis Alumni Scholarship, The University of California at Davis (1982).
- Elected Life Member, California Scholastic Federation (1982).
- Salutatorian, Lindsay, California (1982).

Professional Societies

- Life member, Sigma Xi, The Scientific Research Society (#979990543).
- Member, American Chemical Society (ACS #2391118).
- Member, American Association for the Advancement of Science (AAAS #0150597).
- Member, Association of Polar Early Career Scientists (APECS #1885)
- Member, Planetary Society (#647212)
- Member, Society for Science & the Public (SPP)

Selected Professional & Outreach Activities

- Co-PI, Flight Crew and Co-Mentor, Microgravity University - Minority University Research and Education Program (MUREP) (2013).
- Ground Crew and Co-Mentor, Microgravity University - Systems Engineering Educational Discovery (SEED) program (2013).
- Principal Investigator, Flight Crew and Mentor, Microgravity University - Systems Engineering Educational Discovery (SEED) program (2012).
- Sigma Xi Judge, the Conrad Foundation (2012 – present).
- Judge, California State Science Fair (2012 – present).
- Session Organizer, AbSciCon, “Emerging Technologies and Strategies for Prospecting for the Signs of Life on Other Worlds” (2012).
- Proposal Manager, NAI CAN6, “The Emergence of Life’s Engine” (2011).
- Grand Award Judge, Intel International Science and Engineering Fair (2011).
- Session Chair, Annual Los Angeles County Science Fair (2011 – present).
- Judge, Dwornik Award, Planetary Geology Division of the Geological Society of America (2011).
- Mentor, the Conrad Foundation (2010 – present).
- Given dozens of JPL tours per year to scientists, students, conferences, colleagues, etc. (2009 – present).
- Regional Science Bowl Judge (2005)
- Member, the American Astronautical Society (2004 – 2005).
- Abstractor for Current Biology Publishing, *Macromolecular Structures 1999* and *2000* (1998 – 2000).
- Member, American Crystallographic Association (1996 – 2011).
- Member, International Union of Crystallography (1996 – 2011).
- Life member, Pennsylvania State Alumni Association (1996 – present).
- Dept. of Biochemistry and Molecular Biology graduate student representative (1994 – 1995).
- Member, Protein Society (1993 – 2011).
- Judge, Pennsylvania Junior Academy of Sciences (1992).
- Participated in the National Space Grant College's “Thinking Like a Scientist” program (1991 – 1993).
- Research Assistant, Analytical Chem Lab, Campbell’s Institute for Research & Technology (1/1990 – 9/1991).
- Laboratory Assistant III, School of Medicine, University of California, Davis (4/1989 – 9/1991).
- Research Assistant, Protein Sequencing Laboratory, Calgene Inc. (6/1987 – 4/1989).
- Life member, Cal Aggie Alumni Association (1987 – present).
- Industrial internships at Plant Genetics, Inc. and Calgene, Inc. (1985 – 1987).
- Academic internships at UC Davis, Dept. of Environmental Horticulture and Dept of Pathology (1985 – 1986).
- Genetics Dept. representative to the Dean’s Student Advisory Committee, UC Davis (1985 – 1986).

Managing/Mentoring/Teaching

- DPM for Astrobiology: Exobiology and Evolutionary Biology (EXO), Laboratory Analysis of Returned Samples (LARS) and Habitable Worlds (HW) programs (2012-present).
- GC Lead, LAVA/RESOLVE In Situ Resource Utilization (ISRU) KSC/JPL Collaboration (2012-present).
- Technical Monitor for NASA SBIR Phase I awards to ElectroDynamic Applications, Thorleaf Inc, EIC Inc. (2011-present).
- Technical Monitor for NASA SBIR Phase I, II and IIe awards to Cbana Labs, “Micro GCs for Contaminant Monitoring in Spacecraft Air” (2010 – present).
- Advisor for Jeffrey Foster, Mechanical Engineering Student, University of California, Irvine (2009).
- Supervisor for VCAM PCGC team (2007 – present).

- Co-Advisor for Ellen Harju, Chemical Engineering Honors Student, University of Washington (2004 – 2006).
- Co-Advisor for Jongwei Wooh, Biochemistry Honors Student, University of Queensland (2001 – 2002).
- Co-Advisor for Nayden Koon, Master of Science Student, University of Auckland (1999 – 2001).
- Supervisor for Nayden Koon, Centre for Gene Technology Summer Studentship Program, University of Auckland (1999).
- Teaching Assistant, Advanced Biochemistry Laboratory, The Pennsylvania State University (1992 – 1994).
- Teaching Assistant, Elementary Microbiology Laboratory, The Pennsylvania State University (1992).

Selected Research Skills

- Various chromatography methods including gas chromatography, HPLC, FPLC, LC, gel electrophoresis, TLC.
- Flight training in Electrostatic Discharge (ESD) Control, Connector Mate & Demate, Flight Hardware Safety Awareness, and JPL Critical Item (JCI) Handling as well as Hydrogen, Laser, Radiation, Chemical, Cryogenics, Hazardous Waste, and Pressure Safety.
- Microfluidic design and research for macromolecular concentration, separations and detection.
- Training in microbiology and molecular biology; protein sequencing.
- Training in sealed-tube, rotating anode, and synchrotron X-ray radiation sources; computational biology.
- Field training in polar environments (2000-2001 and 2004-2005 field seasons).

Peer-Reviewed Publications

- Madzunkov, S.M., Simcic, J., **Kidd, R.D.**, Bae, B., Scianmarello, N. & Darrach, M. (2014). Implementation and test results on a mass spectrometer and micromachined preconcentrator and gas chromatograph for crewed and robotic space missions. *Texas Tech*, Electronic ICES-2014-292.
- Russell, M.J., Barge, L.M., Bhartia, R., Bocanegra, D., Bracher, P.J., Branscomb, E., **Kidd, R.D.**, McGlynn, S., Meier, D.H., Nitschke, W., Shibuya, T., Vance, S., White, L. & Kanik, I. (2014). The drive to life on wet and icy worlds. *Astrobiology* **14**, 308-343.
- Barge, L.M., Kee, T.P., Doloboff, I.J., Hampton, J.M.P., Ismail, M., Pourkashanian, M., Zeytounian, J., Baum, M.M., Moss, J.A., Lin, C.-K., **Kidd, R.D.** & Kanik, I. (2014). The fuel cell model of abiogenesis: a new approach to origin-of-life simulations. *Astrobiology* **14**, 254-270.
- Barge, L.M., Doloboff, I.J., Russell, M.J., VanderVelde, D., White, L.M., Baum, M., Zeytounian, J., **Kidd, R.D.** & Kanik, I. (2014). Pyrophosphate synthesis in iron mineral membranes simulating prebiotic submarine hydrothermal precipitates. *Geochimica et Cosmochimica Acta*. **128**, 1-12.
- Madzunkov, S.M., MacAskill, J.A., Simcic, J., **Kidd, R.D.** & Darrach, M. (2013). Recent developments in gas chromatographs and mass spectrometers for crewed and robotic space missions. *J. Am. Inst. Aeronautics & Astronautics*. Electronic 2012-3453.
- Coy, S.L. Krylov, E.V., Nazarov, E.G., Fornace Jr., A.J. & **Kidd, R.D.** (2013). Differential mobility spectrometry with nanospray ion source as a compact detector for small organics and inorganics. *Int. J. Ion Mobil. Spec.* **16**, 217-227.
- Darrach, M.R., Chutjian, A., Bornstein, B.J., Croonquist, A.P., Garkanian, V., Hofman, J., Karmon, D., Kenny, J., **Kidd, R.D.**, Lee, S., MacAskill, J.A., Madzunkov, S.M., Mandrake, L., Schaefer, R.T. & Toomarian, N. (2012). Trace chemical and major constituents measurements of the International Space Station atmosphere by the Vehicle Cabin Atmosphere Monitor. *J. Am. Inst. Aeronautics & Astronautics*. Electronic 2012-3432.
- Darrach, M.R., Chutjian, A., Bornstein, B.J., Croonquist, A.P., Garkanian, V., Haemmerle, V.R., Hofman, J., Heinrichs, W.M., Karmon, D., Kenny, J., **Kidd, R.D.**, Lee, S., MacAskill, J.A., Madzunkov, S.M., Mandrake, L., Rust, T.M., Schaefer, R.T., Thomas, J.L. & Toomarian, N. (2011). On-orbit measurements of the ISS atmosphere by the Vehicle Cabin Atmosphere Monitor. *J. Am. Inst. Aeronautics & Astronautics*. Electronic 2011-5214.
- Ehrenfreund, P., Röling, W.F.M., Thiel, C.S., Quinn, R., Septhon, M.A., Stoker, C., Kotler, J.M., Direito, S.O.L., Martins, Z., Orzechowska, G.E., **Kidd, R.D.**, van Sluis, C.A. & Foing, B.H. (2011). Astrobiology and habitability studies in preparation for future Mars missions: trends from investigating minerals, organics and biota. *Int. J. Astrobiology* **10**, 239-253.
- Orzechowska, G.E., **Kidd, R.D.**, Foing, B.H., Kanik, I., Stoker, C. & Ehrenfreund, P. (2011). Qualitative analysis of soils samples using Solid Phase Microextraction (SPME) and Gas Chromatography/Mass Spectrometry (GC/MS). *Int. J. Astrobiology* **10**, 209-219.

- Darrach, M.R., Chutjian, A., Bornstein, B.J., Croonquist, A.P., Garkanian, V., Haemmerle, V.R., Heinrichs, W.M., Karmon, D., Kenny, J., **Kidd, R.D.**, Lee, S., MacAskill, J.A., Madzunkov, S.M., Mandrake, L., Rust, T.M., Schaefer, R.T., Thomas, J.L. & Toomarian, N. (2010). Validation test results from the Vehicle Cabin Atmosphere Monitor. *J. Am. Inst. Aeronautics & Astronautics*, Electronic 2010-6094.
- Mielke, R.E., Wilson, P.R., Coleman, M., **Kidd, R.D.**, Russell, M.J. & Kanik, I. (2010). Design, fabrication and test of a hydrothermal reactor for Origin-Of-Life experiments. *Astrobiology* **10**, 799-810.
- Chutjian, A., Darrach, M.R., Bornstein, B.J., Croonquist, A.P., Edgu-Fry, E., Fry, D.J., Garkanian, V., Girard, M.A., Haemmerle, V.R., Heinrichs, W.M., **Kidd, R.D.**, Lee, S., MacAskill, J.A., Mandrake, L., Rust, T.M., Schaefer, R.T., Thomas, J.L., Toomarian, N. & Walch, M.J. (2008). Results from the Vehicle Cabin Atmosphere Monitor: a miniature gas chromatograph/mass spectrometer for trace contamination monitoring on the ISS and Orion. *Proc. Int. Conf. Env. Systems*, Electronic 2008-01-2045.
- Chutjian, A., Conroy, D.G., Croonquist, A.P., Darrach, M.R., Edgu-Fry, E., Fry, D.J., Girard, M.A., **Kidd, R.D.**, MacAskill, J.A., Schaefer, R.T. & Toomarian, N. (2007). Overview of the Vehicle Cabin Atmosphere Monitor, a miniature gas chromatograph/mass spectrometer for trace contamination monitoring on the ISS and CEV. *Proc. Int. Conf. Env. Systems*, Electronic 2007-01-3150.
- Woo, J., **Kidd, R.D.**, Martin, J.L. & Kobe, B. (2003). Comparison of three commercial sparse matrix crystallization screens. *Acta Cryst.* **D59**, 769-772.
- Baker, E.N., Baker, H.M., Koon, N. & **Kidd, R.D.** (2002). Lactoferrin: bioactive properties and applications. *Bulletin Int. Dairy Fed.* **375**, 54-58.
- Brittain, T., **Kidd, R.D.** & Baker, E.N. (2002). Electron transfer between cytochrome b₅ and some oxidized haemoglobins - the role of ionic strength. *J. Inorg. Biochem.* **88**, 328-334.
- Baker, E.N., Baker, H.M. & **Kidd, R.D.** (2002). Lactoferrin and transferrin: functional variations on a common structural framework. *Biochem. and Cell Biology* **80**, 27-34.
- Kidd, R.D.**, Brittain, T. & Baker, E.N. (2002). A modeling study of the interaction and electron transfer between cytochrome b₅ and some oxidized haemoglobins. *J. Biol. Inorg. Chem.* **7**, 23-30.
- Kidd, R.D.**, Russell, J.E., Brittain, T. & Baker, E.N. (2001). The role of β chains in the control of hemoglobin oxygen binding function: chimeric human/mouse proteins, structure and function. *Biochemistry* **40**, 15669-15675.
- Kidd, R.D.**, Baker, H.M., Mathews, A.J., Brittain, T. & Baker, E.N. (2001). Oligomerization and ligand binding in a homotetrameric hemoglobin: two high resolution crystal structures of hemoglobin Bart's (γ_4), a marker for α -thalassemia. *Protein Science* **10**, 1739-1749.
- Kidd, R.D.**, Mathews, A.J., Brittain, T. & Baker, E.N. (2001). Subunit dissociation and reassociation leads to preferential crystallization of hemoglobin Bart's (γ_4) from solutions of human embryonic hemoglobin Portland ($\zeta_2\gamma_2$) at low pH. *Acta Cryst* **D57**, 921-924.
- Baker, H.M., Anderson, B.F., **Kidd, R.D.**, Shewry, S.C. & Baker, E.N. (2000). Lactoferrin three-dimensional structure: a framework for interpreting function. in *Lactoferrin: Structure, Function and Applications* (K. Shimazaki *et al.*, eds), pp. 3-15, Elsevier Science, Amsterdam.
- Kidd, R.D.**, Sears, P., Huang, D.-H., Witte, K., Wong, C.-H. & Farber, G.K. (1999). Breaking the low barrier hydrogen bond in a serine protease. *Protein Science* **8**, 410-417.
- Staley, M., Zeringue, L.C., **Kidd, R.D.**, Nixon, B.T. & Farber, G.K. (1998). Crystallization and preliminary X-ray studies of the *Rhizobium meliloti* DctD two-component receiver domain. *Acta Cryst.* **D54**, 1416-1418.
- Chen, X., Reddanna, P., Reddy, G.R., **Kidd, R.D.**, Hildenbrandt, G. & Reddy, C.C. (1998). Expression, purification and characterization of a recombinant 5-lipoxygenase from potato tuber. *Biochem. Biophys. Res. Comm.* **243**, 438-443.
- Teo, B., **Kidd, R.D.**, Mack, J., Tiwari, A., Phillips, A.T. & Farber, G.K. (1998). Crystallization and preliminary X-ray studies of L-histidine ammonium lyase from *Pseudomonas putida*. *Acta Cryst.* **D54**, 681-683.
- Kidd, R.D.**, Yennawar, H., Sears, P., Wong, C.-H. & Farber, G.K. (1996). A weak calcium binding site in subtilisin BPN' has a dramatic effect on protein stability. *J. Am. Chem. Soc.* **118**, 1645-1650.
- Shi, W., **Kidd, R.**, Giorgianni, F., Schindler, J.F., Viola, R.E. & Farber, G.K. (1993). Crystallization and preliminary X-ray studies of L-aspartase from *Escherichia coli*. *J. Mol. Biol.* **234**, 1248-1250.

New Technology Reports

- Lee, M.C., Noell, A.C., Kazarians, G.A., McMurray, D.E., **Kidd, R.D.**, Aubrey, A.D. (2013). Isotropically Defined In-Channel Frit for Microfluidic Ion Chromatograph. *NTR# 49246*.
- Madzunkov, S.M., **Kidd, R.D.**, Simcic, J., Darrach, M., Bae, B. (2013). Highly Miniaturized Gas Chromatograph

Mass Spectrometer for Planetary and Human Exploration. *NTR# 49112*.

Kidd, R.D., Madzunkov, S.M., Garkanian, V., Darrach, M., Bae, B. (2013). NanoRacks-Scale MEMS-Gas Chromatograph System for Technology Demonstration. *NTR# 48859*.

Kidd, R.D., Anderson, R.C., Conrad, P.G. (2008). Coupling Real-Time Gas Chromatography to the RAT and RASP for a "Scratch-and-Sniff" Approach to the Contact Detection of Organics in Rocks. *NTR# 45896*.

Selected Conference Proceedings

- N. Scianmarello, Madzunkov, S.M., Simcic, J., MacAskill, J.A., Darrach, M.R., Tai, Y.-C. & **Kidd, R.D.** (2015). High Performance Liquid Chromatography-Mass Spectrometry Evaporative Coupling for Mars Applications. *28th IEEE International Conference on Micro Electro Mechanical Systems*, Estoril, Portugal, Abstract 0590.
- Beegle, L.W., Bhartia, R., DeFlores, L., Darrach, M., **Kidd, R.D.**, Abbey, W., Asher, S., Burton, A., Clegg, S., Conrad, P.G., Edgett, K., Ehlmann, B., Langenhorst, F., Fries, M., Hug, W., Neelson, K., Popp, J., Sorbon, P., Steele, A., Wiens, R. & Williford, K. (2014). SHERLOC: Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals, an investigation for 2020. *LPSC XLV*, The Woodlands, TX, Abstract 2835.
- Kidd, R.D.**, Darrach, M.R., Madzunkov, S.M., MacAskill, J.A., Chutjian, A., Simcic, J., Neidholdt, E., Sinha, M., Bae, B., Tai, Y.-C. & Captain, J. (2013). An overview of mass spectroscopy-based instrument development at the Jet Propulsion Laboratory. *The 9th Harsh-Environment Mass Spectrometry Workshop*, St. Pete Beach, FL.
- Loftin, K., Griffin, T., Captain, J., **Kidd, R.D.**, Wright, K. & Kielbka, G. (2013). Integration and ruggedization of a commercially available gas chromatograph and mass spectrometer (GCMS) for the Resource Prospector Mission (RPM). *The 9th Harsh-Environment Mass Spectrometry Workshop*, St. Pete Beach, FL.
- White, L.M., Russell, M.J., Bhartia, R., Mielke, R., Shibuya, T., Christenson, L., **Kidd, R.D.**, Hoffman, A., Stucky, G.D. & Kanik, I. (2013). Alkaline hydrothermal vents: Discovering the origins of organic synthesis. *LPSC XLIV*, The Woodlands, TX, Abstract 2341.
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Invited Talks

- *Liquid Chromatography on a Chip for Spaceflight Applications*. Presented at the Caltech Kavli Nanoscience Institute/JPL Microdevices Lab joint seminar series at the Californai Institute of Technology, Pasadena, California, 2013
- *Serendipity in Outreach & Education: Engaging Students in ISS-Related Activities*. Presented at the International Space Station: Engaging your Audiences in Low-Earth Orbit Educator Workshop, NASA's Jet Propulsion Laboratory in Pasadena, California, 2012.
- *Miniature Gas and Liquid Chromatographic Systems for Human and Robotic Missions*. Presented at NASA's Johnson Space Center, Houston, TX, 2011.
- *Enabling In Situ Science on Other Worlds: NASA's Jet Propulsion Laboratory*. Presented at Agilent Technologies, Santa Clara, CA, 2010.
- *The Embryonic Hemoglobins*. Presented at Affinium Pharmaceuticals, Toronto, Canada, 2004.
- *Lactoferrin and Transferrin: Functional Variations on a Common Structural Framework*. Presented at Inpharmatica/UCL, London, United Kingdom, 2002.
- *Hemoglobin: It's Not Finished!* Presented at NASA's Ames Research Center in Mountain View, California, 2000. Presented at NASA's Jet Propulsion Laboratory in Pasadena, California, 2001.
- *Embryonic Hemoglobins: Structure, Function and Electron Transfer Properties*. Presented for the Institute of Molecular Biology, Brisbane, Australia, 2000.
- *Crystal Structures of Hemoglobin Bart's: The Carbonmonoxy Form at 1.7 Å Resolution and the Azido-met Form at 1.86 Å Resolution*. Presented at the Crystal XXI Meeting in Thredbo, Australia, 2000.
- *A Structural Study of the Effects of Dimethylformamide on the Stability and Activity of Subtilisin*. Presented for the Department of Structural Biology at the DuPont-Merck Pharmaceutical Company, 1997.
- *The Effect of Dimethylformamide on the Structure and Activity of Mutants of Subtilisin*. Presented for the X-ray Department of Biochemistry at the Hoffmann-La Roche Pharmaceutical Company, 1996.
- *A Structural Study of Subtilisin BPN' in Dimethylformamide*. Presented for the Department of Structural Biology at Los Alamos National Laboratory, 1996.